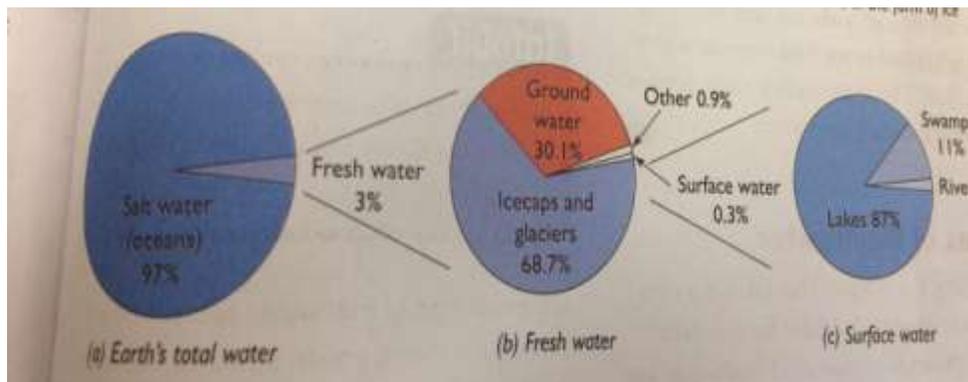


Properties of Water & Air

- Water covers about 3/4ths (70%) of the earth's surface which makes the earth look blue from the space.
- However 97 percent of this water on earth is not fit for Human Consumption as it is salty
- Out of the remaining 3% fresh water, most of it is locked in the form of glaciers & icecaps
- A very little amount of it is what we have left so as to consume in the form of groundwater, lakes, rivers etc.



FORMS OF WATER

On Earth, it is present:

- **IN THE SOLID FORM** : As Snow/ Ice on
 - Peaks
 - Glaciers
 - Icebergs
 - Polar regions
- **IN THE LIQUID FORM** : As
 - in rivers, ocean, lakes , streams etc as Surface Water
 - under the ground as Ground Water
- **IN THE GASEOUS FORM** : As
 - in the atmosphere as water vapour.

Properties of Water

Pure water tasteless, colorless and odorless liquid.

There are a few general properties of water which explain why things happen.

1. Density of Water
2. Solubility in Water

1.Density of Water: If we take 2 glasses of the same size (ie. Same volume) and we pour water in one glass and sand in other glass then the glass with sand will be heavier. Also if we fill one with water and the other with cotton then the glass with water will be heavier.

The glass with sand is heavier than the glass with water because :

Sand is more dense than water. This means that each molecule / atom of sand is heavier than each molecule / atom of water.

Density of a substance is therefore the amount of matter which is present in a unit volume of a substance.

2.Solubility in Water : The ability of a substance to dissolve in a liquid is called its solubility. A substance which dissolves in water is called a soluble substance. For example salt, sugar, etc.

A substance which does not dissolve in water is called an insoluble substance. Examples include sand, oil and chalk powder.

SOURCES OF FRESH WATER

- The main sources of fresh water are the surface water and ground water.

SURFACE WATER

- Surface water is a water occurring on the surface of the Earth in the seas lakes, rivers, streams , oceans etc.
- These bodies get their water from :
 - Rainwater
 - Melting snow from mountain peaks
 - Melted glaciers
- However this surface water contains various dissolved salts, suspended impurities, harmful chemicals from factories etc.

GROUND WATER / UNDERGROUND WATER

- The water found below the water table is known as Ground Water.
- Ground water comes from the natural seeping of water which is also called percolation. It happens through water percolating in the form of rain, snow, sleet, hail and other surface water down into the earth soil.
- At places when this ground water seeps through the soil, it gets collected between layers of hard bedrocks and forms underground water or ground water or Aquifer.
- The upper level of this water is called water table.
- This process of seeping of water downwards through the soil is called **infiltration**.
- This water keeps recharging the ground water and **water from this aquifer can be pumped out by hand pumps and tube wells**.
- Since the groundwater passes through a no. of layers of soil and rock it is quite clean. However it may still contain some dissolved salts or impurities.
-

HOW DOES WATER CIRCULATE AROUND US?

Water circulates around us through the Water Cycle or Hydrologic Cycle .

The cycle comprises of various processes:

- 1). **Evaporation** of water when the solar(sun's) energy converts the surface water into water vapour.
- 2). Plants also lose water to the atmosphere through the pores on the leaves through **Transpiration**.
- 3). Water Vapour that goes up in the atmosphere gets cooled and changes into water droplets that join together to form clouds and then come down through **Precipitation**
- 5). Some of the water that comes down gets evaporated again, while the remaining surface water penetrates through the layers of soil through infiltration(process of seeping water by its downward movement) and becomes the groundwater.

NOTE: WATER IS A RENEWABLE RESOURCE

Renewable Resources – Are those resources that will either never finish or those that are replaced within a reasonable period of time through natural processes. Ground water (this is renewable and gets replenished but due to construction, deforestation etc. is in danger because the rate at which it is used is faster than the rate it is renewed).

SCARCITY OF WATER AND DEPLETION OF WATER TABLE

Water goes in shortage when the water table gets depleted.

Water gets scarce due to:

- 1). Overpopulation
- 2). Growing Industrialization- and rising demand for water
- 3). Climatic changes
- 4). Extensive farming
- 5). Increased Urbanization
- 6). Deforestation
- 7). Wastage by humans

CONSERVATION OF WATER

- A few methods which would help to conserve water are:
 - a. Avoiding leakage of water from taps and pipes
 - b. Not throwing water unnecessarily on the roads and rather using it for gardening and cleaning
 - c. Using mug and bucket instead of a hose pipe to wash a car or to bathe
 - d. Installing taps with reduce flow of water. Avoid unnecessary flushing of toilets
 - e. Reusing the water whenever and wherever possible
 - f. Using drip and sprinkle irrigation for agriculture
 - g. Planting more trees
 - h. Using biodegradable fertilizers and pesticides, so that the ground water is not polluted
 - i. Recycling of water in factories and using it several times before it is disposed off
 - j. Building of dams and **rain water harvesting**
 - k.

RAINWATER HARVESTING: Catch water where it falls!!!

- Rainwater harvesting is a method which helps to recharge ground water.
- It is the gathering and collection of water from the rooftops, roads, and surface run-offs and storing it in tanks. It can also be used directly to recharge the groundwater.
- **There are 2 ways of Rainwater Harvesting:**

- 1. Surface run-off harvesting**
- 2. Rooftop rainwater harvesting**

1. Surface Run-Off Harvesting:

- In this type of rainwater harvesting, the rainwater which falls on the surface & flows into the drains is allowed to reach ground directly from drains by constructing deep pits.

2. Rooftop rainwater harvesting:

- It is a system of catching rainwater where it falls. In Rooftop harvesting the rainwater is collected in tanks from the roofs of houses and buildings through pipes.

AIR

Air that surrounds us is a mixture of several gases, Oxygen, Carbon dioxide, Nitrogen. There are also other gases like water vapor, ozone, hydrogen and helium present in air.

ATMOSPHERE

A thick layer of gases that surround the earth are called the atmosphere. This atmosphere can be divided into five layers:

Starting from top it is :

Troposphere Stratosphere Mesosphere Thermosphere Exosphere

Troposphere:

- Layer closest to the earth's surface.
- Extends approx. upto 15kms above us.
- Contains the air we breathe
- All Weather changes take place here.
- Temperature and Pressure of air drop as we go higher up into the Troposphere.

Stratosphere :

- Stratosphere lies next to the Troposphere.
- 15kms -50 kms
- Contains a thin layer of Ozone that absorbs most of the harmful UV rays coming from the Sun.
- Jet planes fly in this layer.

Mesosphere

- Lies above stratosphere
- 50 Kms to 80 Kms
- Meteors and other stones from space are generally found here.
- Though this layer is very rarefied (very less dense) but still it is thick enough to slow down meteors which generally burn down in this layer and do not reach the earth.

Thermosphere

- From 80 Kms above the earth surface to the outer space.
- Receives extremely high amount of energy from the Sun which makes it very hot with temperatures rising even upto 2000° C
- Space shuttles orbit around the earth in this layer.

Exosphere

- Uppermost layer of the atmosphere.
- The layer where atmosphere merges into space.
- Contains the least amount of air.
- No layer exists beyond this.
- Many satellites orbit here so that the air doesn't slow them down

How atmosphere helps us:

1. Atmosphere maintains the right temperature for the survival things on earth.
2. Atmosphere causes weather changes. When the sun shines it heats the air on the earth. This hot air rises and cold air rushes to take its place. This leads to the blowing of winds which keeps us cool.
The water vapor in the air is responsible for rainfall and snowfall
3. Atmosphere has Ozone – it protects us from harmful UV rays of the sun.
4. It prevents and protects us from meteoroids.

Oxygen Cycle

- Atmosphere has approximately 21% of Oxygen
- Plants release oxygen during photosynthesis and also used this for respiration.
- However, the amount of oxygen released during photosynthesis in the day is much more than the amount of oxygen consumed for respiration by the plants. Therefore there is a net release of oxygen
- **The natural cycle of consumption of oxygen by respiration and in burning, and its release by photosynthesis is called the Oxygen Cycle.**
- Large scale deforestation and excessive burning of fuels can upset this balance and harm us.
- Hence there is need to plant more trees and burn less fuel.

Uses of Air

- Oxygen helps in respiration
- Carbon dioxide helps in photosynthesis.
- The wind rotates the windmill, which is then used for drawing water from the tube wells, for running the flour mills, and for the generation of electricity.
- Wind helps in the movement of aeroplanes, kites, parachutes, and boats.
- Air is an important agent of pollination and seed dispersal.
- Air fills empty spaces in objects like balloons, tyres and tubes to make them useful.
- Different musical instruments like guitar and flute are played with the help of air.
- Birds, insects and bats are able to fly because of presence of air.
- Air plays an important role in the water cycle.

Properties of Air:

1. Air occupies space:
2. Air has weight:
3. Air exerts pressure
4. Air does not have a definite shape. It takes the shape of the container